

REMARKS

This application has been reviewed in light of the final Office Action dated March 22, 2007. Claims 21, 24, 27, 30, 44-54 and 57-66 were pending, with claims 1-20, 22, 23, 25, 26, 28, 29, 31-43, 55 and 56 having previously been canceled, without prejudice or disclaimer. By this Amendment, claims 57 and 62 have been canceled, without prejudice or disclaimer, and claims 21, 44, 47, 51 and 58 have been amended. Support for the amendments to claims 21, 51 and 58 may be found in, for example, page 38, lines 3-6, of the application as filed. Claims 44 and 47 have been amended to clarify the claimed subject matter. Accordingly, claims 21, 24, 27, 30, 44-54, 58-61 and 63-66 are now pending, with claims 21, 44, 47, 51, 58 and 63 in independent form.

Claims 51-54 and 57 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 6,169,722 to Kikukawa et al. Claims 51-54 and 57-62 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Kikukawa '722 in view of EP 1047056 (Misuno '056).

Applicant respectfully traverses the rejections.

The Office Action alleges that it would have been obvious to one skilled in the art at the time the invention was made to modify the recording layer composition proposed in Example 3 of Kikukawa '722 by increasing the atomic ratio of Sb and decreasing the atomic ratio of Te to yield a useful recording layer having composition of $\text{Ag}_6\text{In}_4\text{Sb}_{64}\text{Te}_{24}\text{Ge}_{0.5-2}$.

The Office Action apparently implies that a recording layer composition proposed in JP-A 267926/1996 provides the motivation to make the above mentioned modifications to the recording layer composition proposed in Example 3 of Kikukawa '722. More specifically, the Office Action suggests that a recording layer with content of Te of between 10 to 50 at % and

content of Sb of between 40 to 90 at %, as proposed in JP-A 267926/1996 provides motivation to make the above mentioned modifications.

It is noted that Example 3 of Kikukawa '722 proposes a recording layer composition of $\text{Ag}_6\text{In}_4\text{Sb}_{62}\text{Te}_{28}$ whereby Ge may be added in an amount in the range of 0 to 2 at % (and not $\text{Ag}_6\text{In}_4\text{Sb}_{62}\text{Te}_{26}\text{Ge}_{0.2}$ as suggested by the Examiner).

As previously discussed in detail in the record, the addition of Ge requires a pro rata decrease in the atomic ratio of Ag, In, Sb and Te. Thus, Example 3 of Kikukawa '722, by itself, does not teach or suggest a recording layer having a composition as provided in claims 51 and 58 of the present application.

Further, Kikukawa '722 (column 9, lines 3-36) referred to the recording layer composition in JP-A 267926/1996 specifically to point out the deficiencies of (and thereby teach away from) JP-A 267926/1996 and distinguish the recording layer composition proposed in JP-A 267926/1996 from the recording layer composition proposed by Kikukawa '722. Thus, Kikukawa '722 in view of JP-A 267926/1996 would not have rendered obvious (nor would it have provided motivation) to increase the atomic ratio of Sb and decrease the atomic ratio of Te to yield a recording layer composition as provided by the subject matter of independent claims 51 and 58 of the present application.

In addition, by this Amendment, claims 21, 51 and 58 of the present application have been amended to clarify that the optical recording medium is rewritable at a linear recording velocity ranging from 9 m/sec to 30 m/sec.

Applicant submits that neither Kikukawa '722 nor Mizuno '056 teach or suggest a rewritable phase-change optical recording medium comprising a substrate, a recording layer containing at least materials capable of carrying out read/write/erase operations through phase

changes of said materials therein, and a metal/alloy layer, wherein said recording layer essentially consists of Ag, In, Sb, Te and Ge, with $0.1 \leq a \leq 7$, $2 \leq b \leq 10$, $64 \leq c \leq 92$, $5 \leq d \leq 26$ and $0.3 \leq e \leq 3$, provided that $a + b + c + d + e \geq 97$, wherein the recording medium is rewritable at a linear recording velocity ranging from 9 m/sec to 30 m/sec and wherein the metal/alloy layer includes Al and at least one kind of additive with a content ranging from 0.3 weight percent to 2.5 weight percent, and additive being selected from the group consisting of Ta, Ti, Cr and Si (claim 51), or the metal/alloy layer includes Ag and at least one kind of additive with a content ranging from 0 to 4 weight percent, said additive being selected from the group consisting of Au, Pt, Pd, Ru, Ti and Cu (claim 58).

Claims 21, 24, 27, 30, 49-54 and 57 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over EP 0717404 (Yamada '404) or EP 0735158 (Ide '158), in view of Kikukawa '722. Claims 21, 24, 27, 30, 49-54 and 57 were rejected under 35 U.S.C. §103(a) as being unpatentable over either Yamada '404 or Ide '158 in view of Kikukawa '722, and further in view of Mizuno '056.

The Office Action contends that it would have been obvious to modify the optical recording media of either Yamada '404 or Ide '158 with either Kikukawa '722, by using Al reflective layers containing 0.3 to 2 at % of Si, Cr, Ti, or Ta, or Ag layers containing 0.2 to 4 at % of Au, Pd, Pt or Ti as proposed by Mizuno '056, with reasonable expectation of forming a useful phase-change optical recording medium. The Office Action further contends that the subject matter of independent claim 21 is claimed in product by process format.

Contrary to the contention in the Office Action, claim 21 does not claim the subject matter in product by process format. The parameters of initialization specify overwrite properties of the initialized rewritable phase-change optical recording medium. Specifically,

claim 21, as amended, is directed to a rewritable phase-change optical recording medium having various properties, one of which being, a linear recording velocity ranging from 9 m/sec to 30 m/sec at which the recording medium is rewritable, wherein the recording medium is initialized with a scanning beam spot supplying an energy density in a range of 600 J/m^2 to 1000 J/m^2 .

In Yamada '404 (for example, page 5, lines 40-52), deterioration behaviors of the proposed optical recording media were evaluated at a linear speed of 1.2 m/sec. Also, Ide '158 (for example, page 4, lines 51-59) proposed an optical recording method in which the optical disc is rotated at a linear speed of 1.2 to 5.6 m/sec.

Therefore, Applicant submits that neither Yamada '404 or Ide '158 teach or suggest a rewritable phase-change optical recording medium wherein the recording medium is rewritable at a linear recording velocity ranging from 9 m/sec to 30 m./sec and wherein the recording medium is initialized with a scanning beam spot emitted from a high power semiconductor laser device supplying an energy density in a range of 600 J/m^2 to 1000 J/m^2 .

While Kikukawa '722 and Mizuno '056 propose reflective layers that include Al or Ag, again, neither reference teach or suggest a rewritable phase-change optical recording medium wherein the recording medium is rewritable at a linear recording velocity ranging from 9 m/sec to 30 m./sec and wherein the recording medium is initialized with a scanning beam spot emitted from a high power semiconductor laser device supplying an energy density in a range of 600 J/m^2 to 1000 J/m^2 .

Applicant simply does not find teaching or suggestion in Yamada '404 or Ide '158, in view of Kikukawa '722 or Mizuno '056 of a rewritable phase-change optical recording medium comprising a substrate, a recording layer containing at least materials capable of carrying out read/write/erase operations through phase changes of the materials therein, and a metal/alloy

layer, wherein the recording layer essentially consists of Ag, In, Sb, Te and Ge, with $0.1 \leq a \leq 7$, $2 \leq b \leq 10$, $64 \leq c \leq 92$, $5 \leq d \leq 26$ and $0.3 \leq e \leq 3$, provided that $a + b + c + d + e \geq 97$, wherein the recording medium is initialized at least by irradiating said recording medium with a scanning beam spot emitted from a high power semiconductor laser device, wherein the recording medium is rewritable at a linear recording velocity ranging from 9 m/sec to 30 m/sec, and wherein the metal/alloy layer includes Al and at least one kind of additive with a content ranging from 0.3 weight percent to 2.5 weight percent, said additive being selected from the group consisting of Ta, Ti, Cr and Si.

Claims 44-50 were rejected under 35 U.S.C. §103(a) as being unpatentable over either one of Yamada '404, Ide '158, JP03-240590 (Iwasaki '590), or JP 11-070-737 (Yuzurihara '737), in view of U.S. Patent No. 6,609,175 to Ando et al. and U.S. Patent No. 6,621,780 to Suzuki.

In the present application, independent claim 44 is directed to a phase-change optical recording medium comprising a recording layer which contains information corresponding to S and R values, which are used for selecting an optimum recording power.

The Office Action contends that the claims of the present application do not recite that the values of S or R are stored on the medium.

In order to facilitate prosecution of this application for allowance, and without conceding the propriety of the objection, independent claim 44 has been amended to recite that S and R values are recorded in advance on the claimed phase-change optical recording medium.

Ando '175, as understood by Applicant, proposes an information storage medium with an embossed control data zone (in the non-writable portion of the storage medium) with recorded information regarding the medium. However, Ando '175 does not teach or propose recording

information (in name or in substance) corresponding to S and R values for selecting an optimum recording power, as described in claim 44.

Suzuki '780, as understood by Applicant, proposes determining an optimal recording power based on a relationship between modulation parameters and recording power. In Suzuki, a gamma, which defines a ratio of a change of the modulation parameter to a change of the recording power, is calculated for selected pairs of modulation parameter and recording power. A target recording power corresponding to the optimum recording power is found based on a function derived from a relationship between the calculated gammas and the respective recording powers, where the target recording power causes a value of the function to be equal to zero.

The Office Action (page 10) contends that in the present application, choosing a value for S defines "the linear portion of the sensitivity curve ($D \log H$) and the minimum (base) recording power" and that choosing a value for R defines "the upper range of the useful power range". It is further contended in the Office Action, without citation of any support in the present application, or in Suzuki '780, that this characterization of S and R values correspond to values discussed in Suzuki '780.

After careful review of the cited art, Applicant simply does not find the basis for the unsupported contention made in the Office Action. There is no teaching or suggestion in the cited art of a phase-change optical recording medium that includes such information as characterized by the Office Action.

Independent claim 47 is patentably distinct from the cited art for similar reasons.

Claims 51-54 and 57-62 were rejected under the judicially created doctrine of obviousness-type double patenting as purportedly unpatentable over claims 1-14, 17-25 and 27-32 of co-pending Application No. 09/966171 (Publ. No. 2002/0110063)

Claim 1 of U.S. patent application Serial No. 09/966171 is directed towards a phase-change type optical information recording medium storing information that indicates a standard recording linear velocity and/or a maximum recording linear velocity. In addition, claim 9 of U.S. patent application Serial No. 09/966171, which further describes the phase-change optical recording medium of claim 1 of the same application, requires that the recording layer is made of material that satisfies a relation: $(\text{Ag, Ge})_{\alpha}(\text{In, Ga, Bi})_{\beta}\text{Sb}_{\gamma}\text{Te}_{\delta}$ where (Ag, Ge) means at least one element selected from Ag and Ge, (In, Ga, Bi) means at least one element selected from In, Ga, and Bi, and where α , β , γ and δ represent atomic percentages satisfying the relation $0.1 \leq \alpha \leq 7$, $1 \leq \beta \leq 15$, $61 \leq \gamma \leq 85$ and $20 \leq \delta \leq 30$.

None of the claims of U.S. patent application Serial No. 09/966171 teach or suggests an optical recording medium as described in claims 51 or 58 of the present application, wherein the recording layer essentially consists of Ag, In, Sb, Te and Ge, with a proportion in atomic percent of a(Ag): b(In): c(Sb): d(Te): e(Ge), with $0.1 \leq a \leq 7$, $2 \leq b \leq 10$, $64 \leq c \leq 92$, $5 \leq d \leq 26$ and $0.3 \leq e \leq 3$, provided that $a + b + c + d + e \geq 97$

Therefore, Applicant submits that the claims of Application No. 09/966171 are patentably distinct from the claimed invention of claims 51-54 and 57-62 of this application, and do not disclose or render obvious claims 51-54 and 57-62.

Withdrawal of the rejection under the judicially created doctrine of obviousness-type double patenting is requested.

Accordingly, for at least the above-stated reasons, Applicant respectfully submits that independent claims 21, 44, 47, 51, 58 and 63, and the claims depending therefrom, are patentable over the cited art.


In view of the amendments to the claims and remarks hereinabove, Applicant submits

that the application is now in condition for allowance. Accordingly, Applicant earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that may be required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paul Teng", is written over a horizontal line.

Paul Teng, Reg. No. 40,837
Attorney for Applicant
Cooper & Dunham LLP
Tel.: (212) 278-0400